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Wind and Solar Subsidy Policy Based on Combustion Theory

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Abstract: Evaluating the existing fiscal and taxation policies of the clean energy industry and putting forward relevant policy suggestions can further promote the rapid development of my country's clean energy industry, which is of practical significance. The purpose of this paper is to study wind and solar subsidy policies based on combustion theory. On the basis of reviewing the domestic and foreign related literature on the fiscal and taxation policies of the clean energy industry, starting with the development overview of the clean energy industry, based on the social combustion theory, the energy development and evolution mechanism from the perspective of the social combustion theory is discussed, and the least squares method is constructed (OLS) and generalized method of moments (GMM) model, analyze the business data of clean energy industry-related enterprises from 2018 to 2021, and select "enterprise power generation" as the explanatory variable government subsidy" as the explanatory variable to construct a panel model. Regression analysis was carried out on the fiscal and taxation subsidy policies of the clean energy industry. The experimental results show that taking the economic benefits of enterprises as the assessment standard has a significant role in promoting the wind power generation of enterprises by fiscal and taxation subsidy policies.

1. Introduction

In the era of rapid economic development, there are more and more requirements for energy and more and more constraints on energy. Optimizing the development structure of energy has become an urgent need for energy development, and the importance of developing renewable energy has become increasingly prominent. The state also proposes to speed up the reform of energy production and consumption, and accelerate the transformation of the direction of energy development [1-2]. Make it clear that increasing the supply of clean and green energy and increasing the proportion of clean energy production and consumption is the basis of the energy revolution. Renewable energy is an important part of the energy system, which has the advantages of diverse types, wide regional distribution, remarkable environmental protection effect and sustainable utilization [3-4].

The influence of the government's subsidy policy on new energy products and its adjustment over time is also a hot issue of concern in today's society [5]. Yadav P proposes a revised rural energy transition framework to support the SHS capital subsidy scheme, which specifically includes households below the poverty line, through pro-poor subsidies, and incorporate an electronic subsidy payment mechanism aimed at improving efficiency and effective delivery among the five key players. These include the National Agriculture and Rural Development Bank, Regional Rural Banks, and suppliers deploying and maintaining subsidized SHS, as well as rural households. The framework will establish contractual partnerships between banks and suppliers and, at the policy level, require the government to force banks to lend at low margins and provide targeted subsidies to low-income groups to achieve rural energy transition [6]. MAL is a tiered and multi-policy energy trader. It includes data analysis (DA), deep sequence-to-sequence recurrent neural networks (DS2S), and reinforcement learning (RL). Longoria G demonstrates MAL in a scenario of a price taker wind farm with a hydroelectric power plant. The testbed is real data from NordPool and East Denmark (DK2). More specifically, electricity consumption, wholesale and equilibrium prices, cross-border energy exchanges, and weather conditions. MAL optimizes the combined production of wind farms and hydraulic pumped storage. Run hydroelectric power plants to avoid wind energy spillover or to store cheap market electricity [7]. The sustainable development of renewable energy is an indispensable and important way to realize the transformation of energy supply, and it is also an important part of building an ecological civilization.

Under the analysis framework of the social combustion theory, this paper outlines the background of the urgent need for energy development, the overall progress of the event and the focus of attention, and at the same time, according to the accumulation of "combustion materials" and the addition of "combustion accelerants", it analyzes the incident in detail. To support the development of energy governance, highlight the key points, seize the core governance points, improve the efficiency of development governance, and analyze the implementation effect of fiscal and taxation policies for the power generation industry.

2. Research on Wind Energy and Solar Energy Subsidy Policy Based on Combustion Theory

2.1 Social Burning Theory

Social Burning Theory compares human society to the burning phenomenon of nature, a system or order established today in a social system that, over time, has a spontaneity to evolve towards new, discarding existing, and desired new goals trend [8-9]. Social burning theory explains how social systems evolve from an orderly organization to disorder, chaos, and eventual collapse. And then through "self-organization" to establish a new orderly social system [10]. In addition, the construction of a new and orderly social system will go through the mainstream fatigue process in the same way, repeating the previous process of inferiority, forming a periodic succession pattern of social change behavior waves, which is commonly referred to as "long-term and long-term separation. Divide for a long time and come together." A schematic diagram of the evolution of social combustion theory is shown in Figure 1.

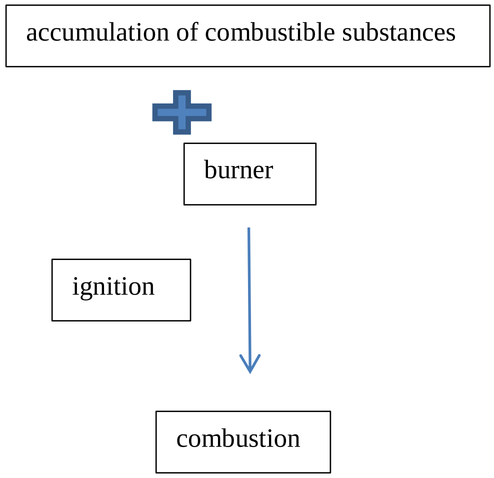

Figure 1. Schematic diagram of the evolution of social combustion theory

Its description of the process of inferior quality is: as the burning substances in society continue to accumulate, the temperature of the system continues to rise, and the particles in the system, i.e. individuals, will gain energy, thereby achieving a transition and breaking away from their original trajectories. Individuals in the system. It also gradually shows polymorphism, the social entropy value increases, and the system appears disordered [11-12]. At the same time, the social combustion accelerant will continue to accelerate the acquisition of individual energy and eventually accelerate the accumulation of burning substances, so that it quickly reaches the threshold, and finally the social ignition temperature, that is, the ignition of the fuse, will cause the system to burn, achieving an orderly to disorderly upheaval [13-14].

2.2 Evolution Mechanism from the Perspective of Social Combustion Theory

(1) Accumulation of "burning matter"

As the global climate changes, people realize that the use of fossil fuels not only increases pollution emissions, but also consumes the earth's non-renewable resources. Therefore, it has also become a major trend to replace traditional fossil energy with renewable and clean energy such as solar energy, wind energy, biomass energy, tidal energy, geothermal energy, and hydrogen energy [15]. In recent years, in order to protect the environment and save resources, governments around the world have formulated a series of environmental regulations to limit carbon emissions, and on the other hand, they have provided supportive policies for new energy products. Broadly speaking, new energy products are products that can use renewable energy to replace fossil energy [16].

(2) Addition of "combustion accelerant"

Since the development of new energy products is not yet mature, the cost of R&D and production investment is high, so the products are expensive and difficult to be accepted by consumers [17]. However, in order to reduce environmental pollution, governments around the world hope to promote the development of new energy products to reduce the use of traditional products, so they have adopted the means of financial intervention in the market, and introduced incentive policies such as subsidies, tax incentives, and trade-in to stimulate consumers to buy new products [18].

2.3 Summary of Renewable Energy Policy

(1) Summary of wind energy policies

Under the banner of the current "Thirteenth Five-Year Plan", Shandong Province proposed to strengthen the construction of wind power bases, speed up the increase of grid-connected capacity, and solve the problem of electric energy consumption the role of the platform, and expand the local consumption capacity. The power-related departments are required to properly handle the connection between renewable energy power purchases and traditional power market transactions when compiling annual power generation and power purchase arrangements. The government should also strengthen the monitoring of renewable energy power consumption, and publish the monitoring and evaluation results on an annual basis, and report to the National Energy Administration to facilitate the formulation and implementation of relevant policies in the future.

(2) Summary of solar energy policies

As for the solar energy industry policy, it is mainly aimed at photovoltaic power generation, photovoltaic heating planning, electricity price subsidies, photovoltaic poverty alleviation and so on. At present, the most important thing is to promote the progress of related technologies through policy support. Because solar energy has the fastest growth among renewable energy sources, strengthening research and development can make full use of solar energy to a greater extent, such as the development of high-temperature and high-efficiency solar collectors and photovoltaic systems. Integrate and other equipment products and key modules, and encourage photovoltaic photothermal technology and product R&D and production activities. At the same time, it is also necessary to ensure a reasonable solution to the grid-connected consumption of solar energy resources, ensure that subsidies are issued on time, and focus on the photovoltaic poverty alleviation project plan, so as to promote photovoltaic poverty alleviation work in a solid and orderly manner.

3. Investigation and Research on Subsidy Policy of Wind and Solar Energy Based on Combustion Theory

3.1 Research Methods

This paper uses Stata15.0 software to analyze the business data of clean energy industry-related enterprises in my country from 2018 to 2021 and builds a panel model, and uses ordinary least squares (OLS) and generalized method of moments (GMM) to analyze the fiscal and tax policies of clean energy industry. Perform regression analysis.

3.2 Variable Selection and Model Construction

(1) Variable selection

The purpose of implementing fiscal and taxation policies for the clean energy industry is to increase the power generation of clean energy companies. Therefore, this paper selects the power generation of each enterprise in the clean energy industry as the explained variable, and subdivides the enterprises to analyze the power generation of each enterprise in the solar power generation and wind power generation industries.

Explanatory variables: The research object of this paper is the fiscal and taxation policies of the clean energy industry. Fiscal and taxation policies mainly include fiscal subsidies and tax rebates, while government subsidies include these two aspects. Therefore, government subsidies are selected as explanatory variables to measure the effect of government subsidies on the power generation of enterprises.

Dummy variable: When the fiscal and taxation policies have an effect on the power generation of the enterprise, the net profit of the enterprise will also have an impact on the power generation of the enterprise in the process of its effect. In order to measure its impact, this paper constructs a dummy variable, which is set to 1 when the net profit of the company in the current year is not lower than the net profit of the previous year, and set to 0 when the net profit of the company is lower than the net profit of the previous year.

Control variables: This paper selects asset scale, equity scale and bank loan scale as control variables. This paper takes the listed companies in the solar power generation, wind power generation and hydropower generation industries published in the Wind database as samples, and selects the 2018-2022 financial statement data of each listed company and the company's power generation data in the corporate annual report on the official website of each listed company.

(2) Model construction

Based on the above analysis, the following basic model is constructed:

$$\text{Power} = \beta_0 + \beta_1 \times Gov + \beta_2 \times Asset + \beta_3 \times Equity + \beta_4 \times Loan + \delta \quad (1)$$

When the fiscal and taxation policies have an effect on the power generation of the enterprise, the net profit of the enterprise will also affect its application effect. In this paper, the dummy variable net profit and the fiscal and taxation policy product are added to the formula (1) as an interaction term to measure its impact, and the formula (2) is obtained:

$$\text{Power} = \beta_0 + \beta_1 \times Gov + \beta_2 \times Asset + \beta_3 \times Equity + \beta_4 \times Loan + \delta_5 \times D * Gov + \delta \quad (2)$$

4. Analysis and Research of Wind Energy and Solar Energy Subsidy Policy Based on Combustion Theory

4.1 Analysis of the Effect of the Implementation of Fiscal and Taxation Policies for the Solar Power Generation Industry

From the regression results in Table 1, when the government's fiscal and taxation policies play a role in the power generation of enterprises, without considering the economic benefits of enterprises, it can be seen from the GMM estimation results of formula (1) that the government's fiscal and taxation policies have a significant effect on enterprise income. The positive promotion effect (the coefficient is 67.82), and the enterprise income will also increase with the increase of the enterprise asset scale, which shows that the government's fiscal and taxation policies will be affected by the enterprise asset scale when it plays a role in the enterprise income. The larger the promotion effect, the more obvious. After adding the product of the dummy variable and the government's fiscal and tax policy as an interaction term, the GMM estimation result of formula (2) shows that the effect of fiscal and tax policy on corporate income is increased (from 67.82 to 80.95), as shown in Figure 2, but The coefficient of the interaction term is not significant, indicating that for the solar power generation industry, the purpose of the government's fiscal and taxation policies is to promote the increase in the power generation of enterprises. Large), but it will not reduce the government's fiscal and tax subsidies to enterprises because of the worsening economic benefits.

Table 1. Regression results of solar power generation industry

variable	Formula (1) OLS	Formula (1) GMM	Formula (2) GMM
Fiscal and tax policies	7.69	67.82	80.95
Asset size	0.32	1.23	1.38
Equity scale	-0.14	-1.25	-1.01

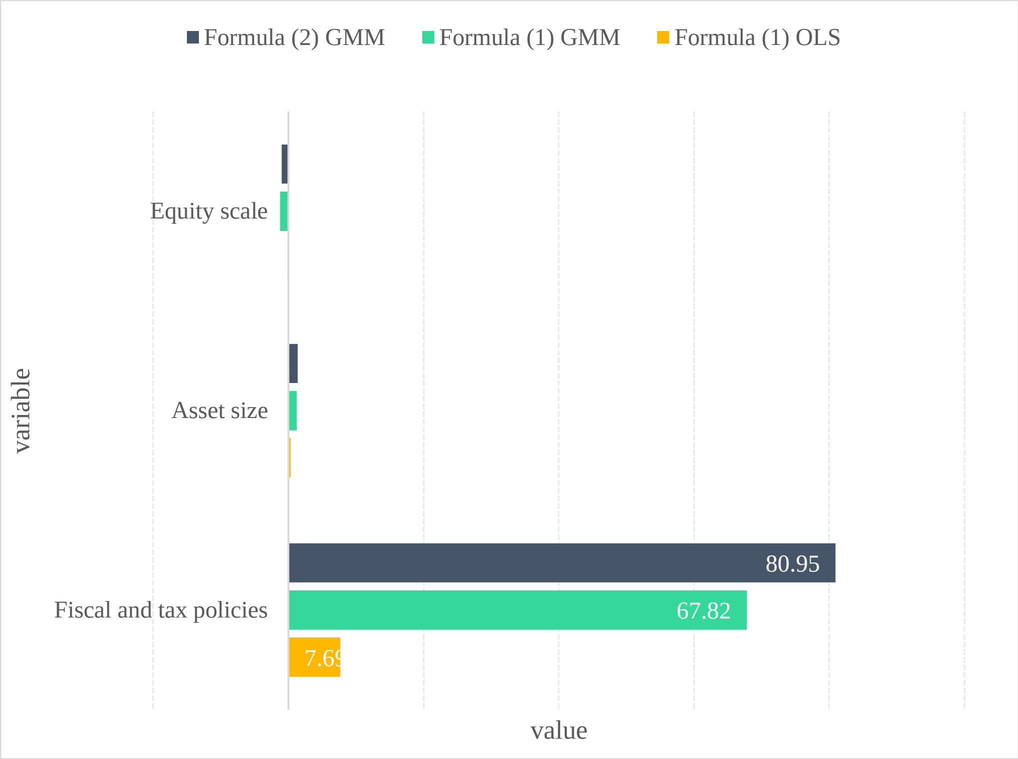

Figure 2. The effect of the implementation of fiscal and taxation policies for the solar power generation industry

4.2 Analysis of the Implementation Effect of Fiscal and Taxation Policies for the Wind Power Generation Industry

From the regression results in Table 2, when government fiscal and taxation policies play a role in the power generation of enterprises, without considering the economic benefits of enterprises, the GMM estimation results of formula (1) show that the government fiscal and taxation policies have an impact on the power generation of wind power generation enterprises. The output has a positive promoting effect. At the same time, the expansion of the enterprise's asset scale will also promote the increase of the power generation. The increase of the total assets of the enterprise will increase the production and operation scale. At this time, the effect of the government's fiscal and taxation policies on the power generation of the enterprise can be improved. In the case of considering the influence of the interaction term, the effect of government fiscal and taxation policies on the power generation output of enterprises has been greatly improved (the coefficient changed from 36.74 to 60.98). The assessment standard has a significant role in promoting the power generation of enterprises by fiscal and taxation policies. When the business performance of enterprises becomes better or worse, the government increases or decreases the absolute amount of fiscal and tax subsidies, which is used as an incentive for enterprises, so that fiscal and taxation subsidies can be increased or decreased. The efficiency of the policy on the power generation of enterprises has been greatly improved.

Table 2. Regression results of wind power generation industry

variable	Formula (1) OLS	Formula (1) GMM	Formula (2) GMM
Fiscal and tax policies	7.95	36.74	60.98
Asset size	-0.12	0.25	0.36
Equity scale	0.78	-0.11	-0.33

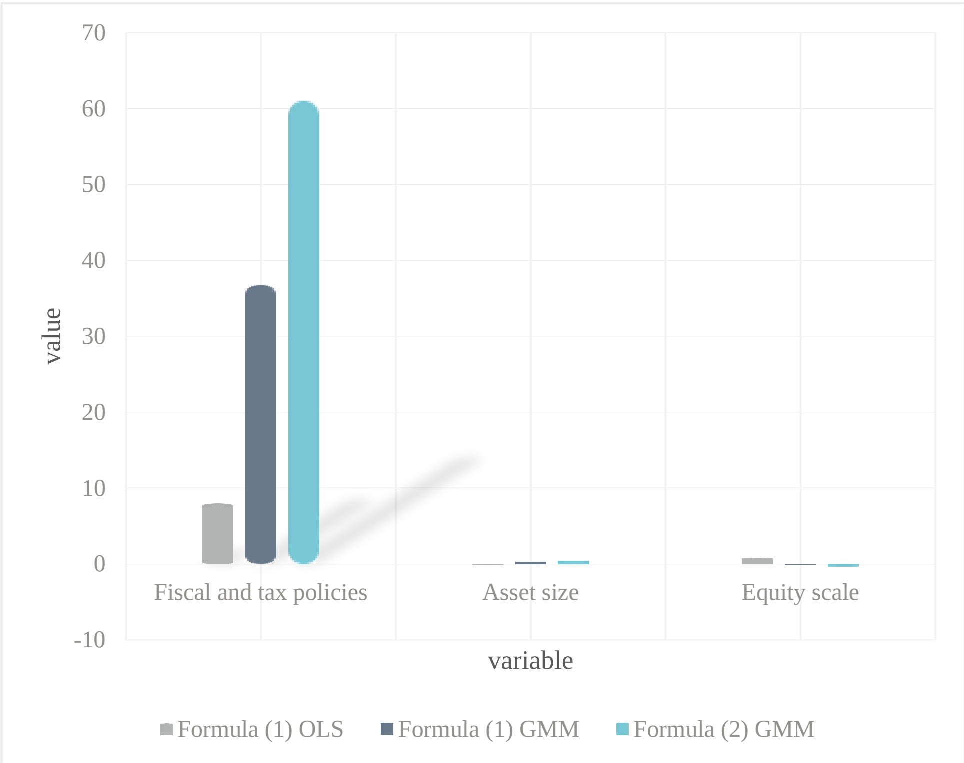

Figure 3. The implementation effect of fiscal and taxation policies for the wind power generation industry

5.Conclusions

At present, my country's clean energy industry is still in the early stage of industrial development, and the government is in urgent need of policy support to guide the transformation and upgrading of the energy industry. In view of the background that the development of new energy products is vigorously advocated and governments around the world adopt subsidy policies to stimulate the consumption of new energy products, this paper studies the pricing decisions of the supply chain in different scenarios and analyzes the impact of government subsidies. Combined with the characteristics of social combustion theory: the accumulation of "combustion materials", the addition of "combustion accelerants" and other theories are introduced into the research to make the research content closer to the theory, and build a GMM estimation model to solve the solar and wind power generation industry through optimization theory regression results.

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